



5605

WATER METER SERVICE MANUAL

HOBART
Model HWM

BAXTER
Model SP600-M1
Model SP600-M3



5633

- NOTICE -

This Manual is prepared for the use of trained Hobart Service Technicians and should not be used by those not properly qualified. If you have attended a Hobart Service School for this product, you may be qualified to perform all the procedures described in this manual.

This manual is not intended to be all encompassing. If you have not attended a Hobart Service School for this product, you should read, in its entirety, the repair procedure you wish to perform to determine if you have the necessary tools, instruments and skills required to perform the procedure. Procedures for which you do not have the necessary tools, instruments and skills should be performed by a trained Hobart Service Technician.

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GENERAL

INTRODUCTION

All of the information, illustrations and specifications contained in this manual are based on the latest product information available at the time of printing.

The water meter will deliver a specific amount of water at a specific temperature and is microcomputer controlled. A chiller can be connected to the meter and is controlled by a relay located inside the meter. There are large digital displays and a temperature probe which senses flour, dough, or room temperature.

Features

- Units of Measure: English (°F, Pounds/Ounces) or Metric (°C, Liters/centiliters) may be selected for water temperature and amount.
- Set Temperature: Displays actual and set temperatures. Adjustment light indicates when meter is adjusting temperature due to new setting or fluctuations in line temperature or pressure. Temperature range is between 32°F and 99°F, or 0° and 37°C.
- Test Flow: Allows meter to adjust water temperature before delivering to mixer.
- Set Amount and Amount Delivered: Individually displayed. Dispenses 5 - 1,000 pounds or 2 - 462 liters. Delivery can be interrupted, the amount set changed (above the amount already dispensed) and delivery resumed. The total amount delivered is the last set amount entered and displayed.
- Start/Resume: Begins delivery cycle or resumes cycle when interrupted.
- Power Failure Safe Memory: Water meter remembers last setting during blackout or accidental disconnection from power.

Specifications

- Input hot water = 140°F maximum, 30-100 psi, 1/2" pipe.
- Input cold water = 32°F minimum, 30-100 psi, 1/2" pipe.
- Requires 120V AC 60/1 outlet with ground fault protection. Less than 1 amp draw.
- Delivery accuracy: ± 1% @ 20 psi. inlet pressure (above 6 lb. Delivery).
- Temperature accuracy: ± 2°.
- Temperature adjustment time: Normally less than 30 seconds for any set temperature.

Delivery System

The meter has hot and cold water inputs. The inputs have external pressure regulators and gauges supplied to adjust the incoming flow pressures to 20 psi. Inside the meter the hot and cold water lines join at the mixing valve and exit the mixing valve from the mixer output line.

On standard meters (HWM, SP600-M1), this mixer output line contains the internal water temperature sensor, the flow meter and the solenoid shut off valve. The water exits through a backflow preventer and out through the delivery hose.

On chiller meters (SP600-M3), the mixer output line branches out into two lines. One line is the same as the standard meter. The other line is a bypass line which has a separate shut off solenoid and can recycle water to the chiller or can go to a drain. The second line allows the water temperature to stabilize without having to move the dispensing hose between a sink and desired delivery location, which is necessary with the standard meter.

On both standard and chiller meters there is a relay supplied which when hooked up to the chiller will turn on the pump whenever "Test Flow" or "Delivery" is running.

Quantity Measuring System

The meter uses a positive displacement paddlewheel style flow meter to measure the amount of water flowing through the system. This flow meter sends out a nominal 154 electrical pulses per gallon that are read by the microprocessor.

Temperature Mixing System

The hot and cold water mixing system uses a three-way valve which is controlled by a 12VDC gearmotor and two limit switches. The mixed water's temperature is measured by the water thermistor. This information is sent back to the control board which compares this temperature with the set temperature and turns the valve accordingly using the gearmotor, thereby changing the water temperature. This is done until the set water temperature is achieved or until one of the limit switches is reached.

OPERATION

For operation instructions refer to the documentation shipped with the unit.

CLEANING

For cleaning instructions refer to the documentation shipped with the unit.

INSTALLATION

For installation instructions refer to the documentation shipped with the unit.

TOOLS

- Standard set of hand tools.
- VOM meter.

NOTE: Any quality VOM with a sensitivity of 20,000 ohms per volt can be used.

- Thermometer.
- Teflon tape Part # 508473.
- RTV sealant, clear. (General Electric RTV 108 or equivalent)

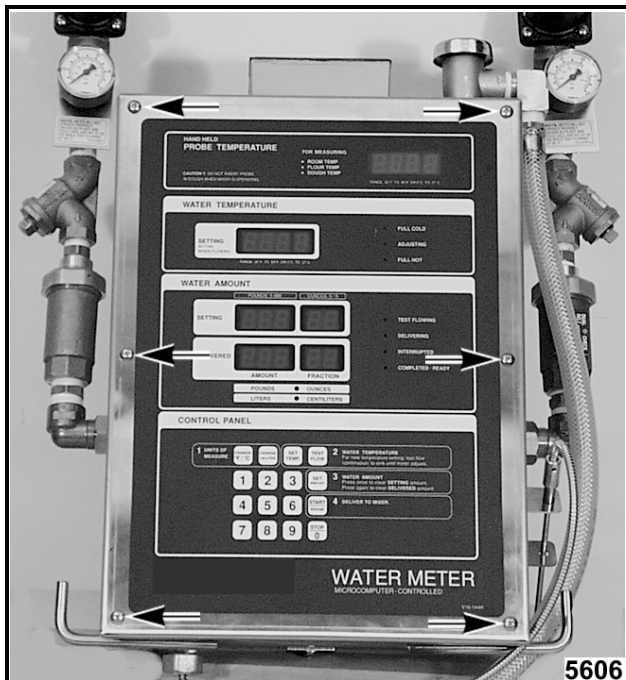
REMOVAL AND REPLACEMENT OF PARTS

NOTE: Use Teflon pipe tape (sealer) on all pipe threads.

FRONT COVER

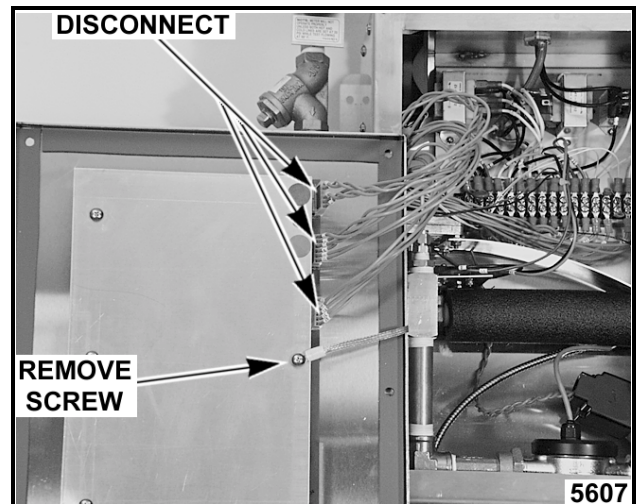
WARNING: DISCONNECT THE MAIN POWER CORD.

1. Remove six screws securing front cover.



2. Identify and disconnect three connectors from control board.

3. Remove screw securing ground strap to front cover. Watch for spacer underneath shield.



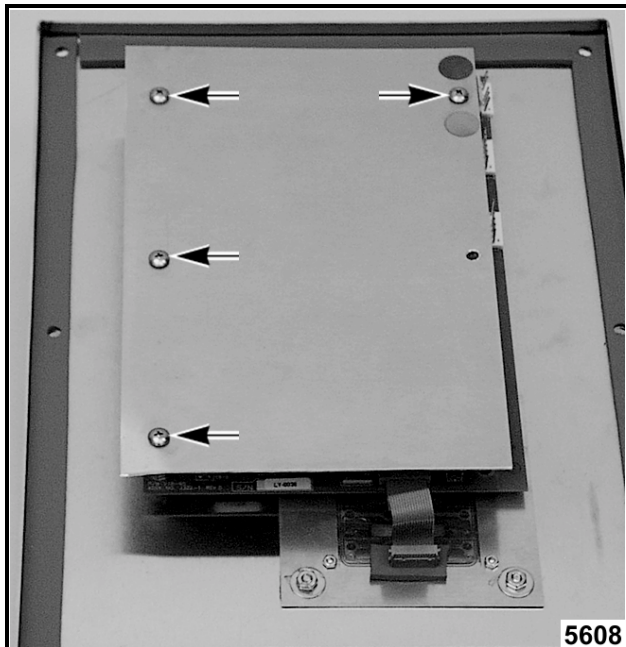
4. Lay cover on padded area to prevent damaging front surface.
5. Reverse procedure to install.

CONTROL BOARD

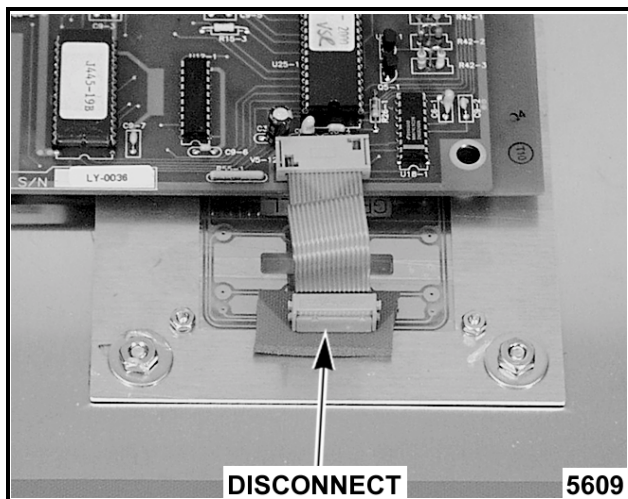
WARNING: DISCONNECT THE MAIN POWER CORD.

CAUTION: Certain components in this system are subject to damage by electrostatic discharge during field repairs. A field service grounding kit is available to prevent damage. The field service grounding kit must be used anytime the control board is handled.

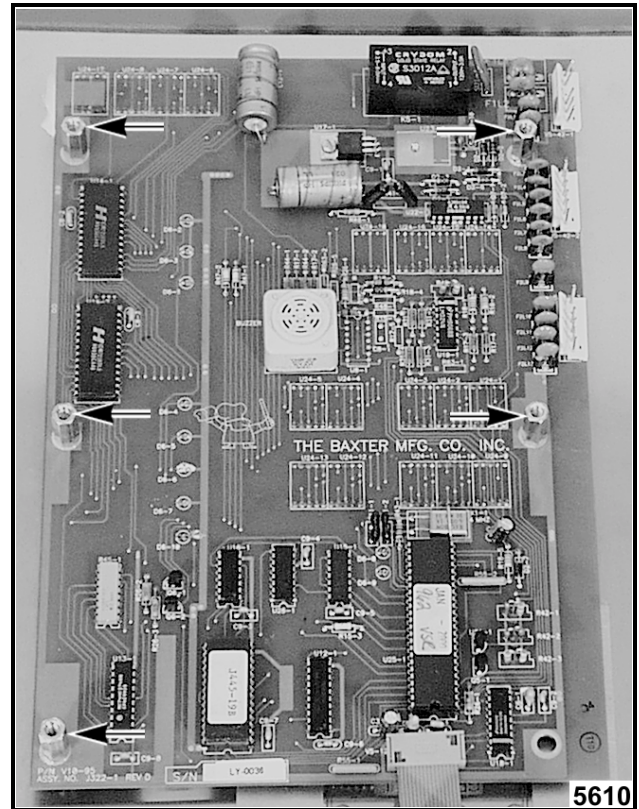
1. Remove "FRONT COVER".
2. Remove screws securing metal shield. Watch for spacers on each screw underneath the shield.



3. Disconnect connector from keypad.



4. Remove standoffs securing control board and lift board off.



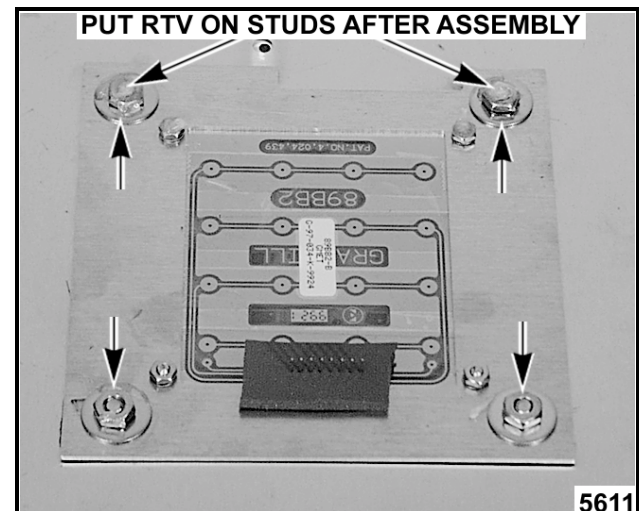
5. Reverse procedure to install.

KEYPAD ASSEMBLY

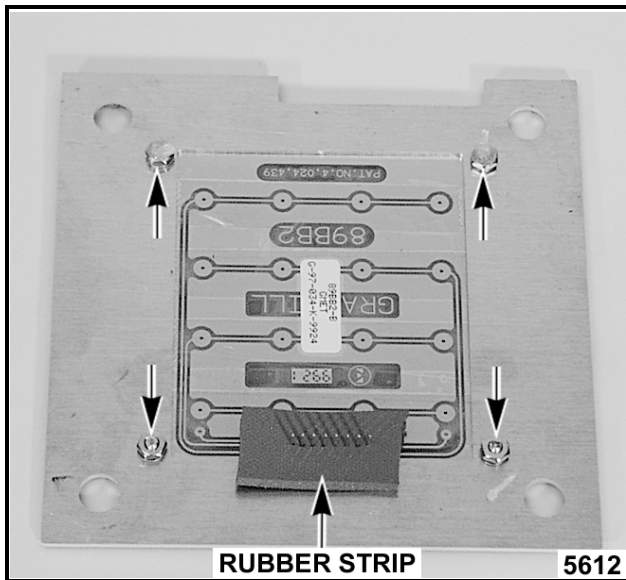
WARNING: DISCONNECT THE MAIN POWER CORD.

1. Remove the "CONTROL BOARD".
2. Remove nuts and flat washers securing keypad assembly to front cover and lift assembly off.

NOTE: On reassembly, put RTV on top two studs to insulate them from the back of the control board.



3. Remove nuts and lockwashers securing keypad to plate.
4. Pull rubber strip off pins.



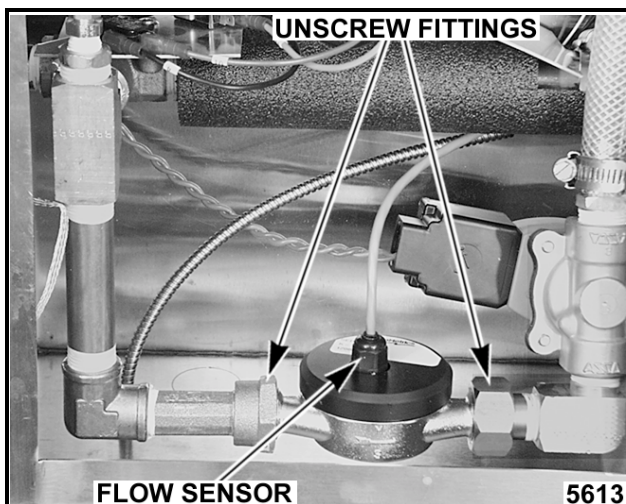
5. Separate keypad from mounting plate.
6. Reverse procedure to install.

FLOW METER

NOTE: Any wire ties removed should be replaced when service is complete.

WARNING: DISCONNECT THE MAIN POWER CORD.

1. Shut off the hot and the cold water incoming water supplies.
2. Remove "FRONT COVER".
3. Identify and disconnect flow meter wires from terminal strip.
4. Unscrew fitting on both sides of flow meter. Watch for fiber sealing washers.



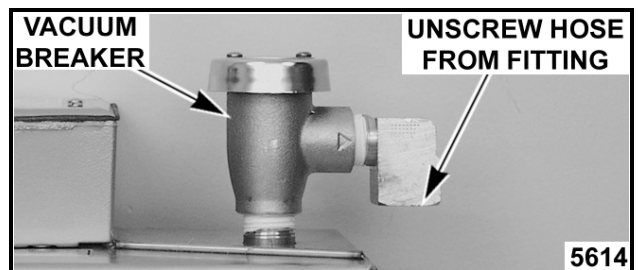
5. Lift flow meter out of unit.
6. Reverse procedure to install.

NOTE: Make sure flow sensor on top of flow meter is finger tight.

VACUUM BREAKER

WARNING: DISCONNECT THE MAIN POWER CORD.

1. Shut off the hot and the cold water incoming water supplies.
2. Unscrew dispensing hose from outlet of vacuum breaker.
3. Unscrew vacuum breaker from welded fitting.



4. Remove fitting from old vacuum breaker and install on new one.
5. Reverse procedure to install.

SOLENOID VALVE

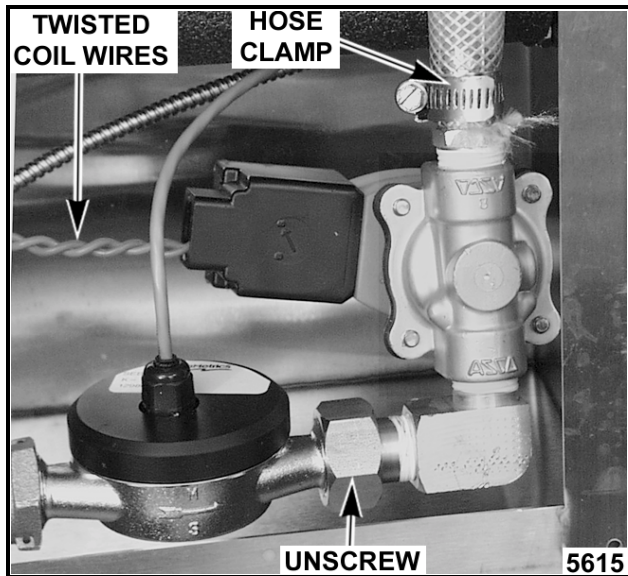
WARNING: DISCONNECT THE MAIN POWER CORD.

1. Shut off the hot and the cold water incoming water supplies.
2. Remove "FRONT COVER".
3. Identify and disconnect solenoid coil wires from terminal strip.

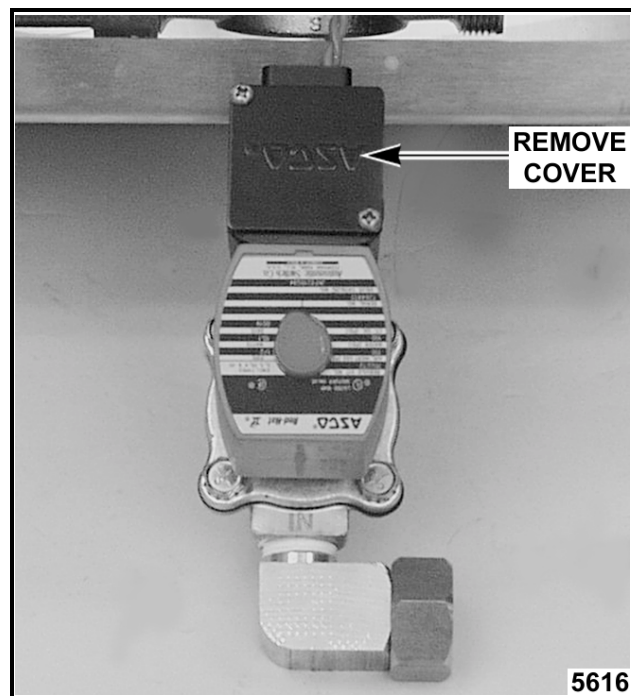
NOTE: Keep wires twisted to reduce electrical noise.

4. Loosen hose clamp at top of solenoid valve.

5. Unscrew fitting on right side of flow meter. Watch for fiber sealing washer.



6. Work solenoid valve fitting out of hose and lift valve assembly out of unit.
7. Remove cover from coil junction box and disconnect wires. Install wires on new valve.

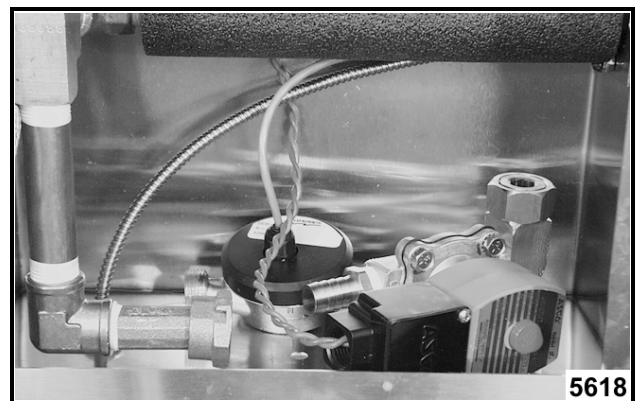


8. Remove fittings from solenoid valve and install on new valve.
9. Reverse procedure to install.

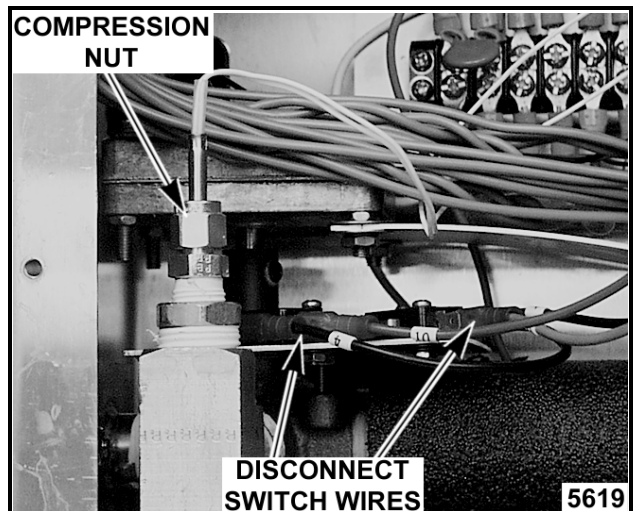
MIXER VALVE / GEAR MOTOR / SWITCHES

WARNING: DISCONNECT THE MAIN POWER CORD.

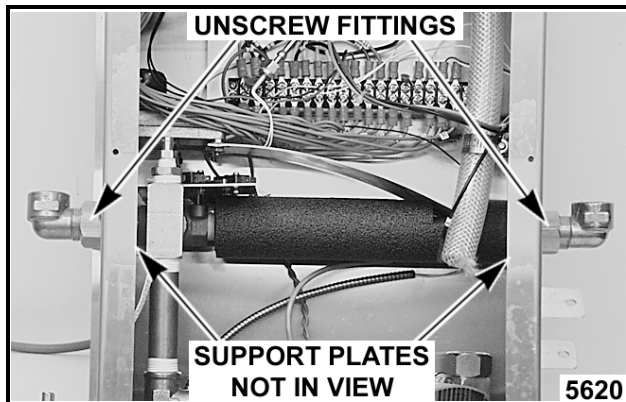
1. Shut off the hot and the cold water incoming water supplies.
2. Remove "FRONT COVER".
3. Identify and disconnect motor wires from terminal strip.
4. Do steps 4, 5, and 6 in removing "SOLENOID VALVE". Lay assembly in bottom of box.
5. Unscrew left fitting on flow meter and lay meter in bottom of box.



6. Unscrew thermistor compression nut and pull thermistor out of pipe. Let thermistor hang free inside box or tuck it into the wiring harness.
7. Identify and disconnect wires from switches.



8. Unscrew fittings on incoming hot water line and cold water line.
9. Remove screws and nuts securing pipe support plates to sides of box.



10. Work assembly out by sliding it to the right side and lifting out of box.

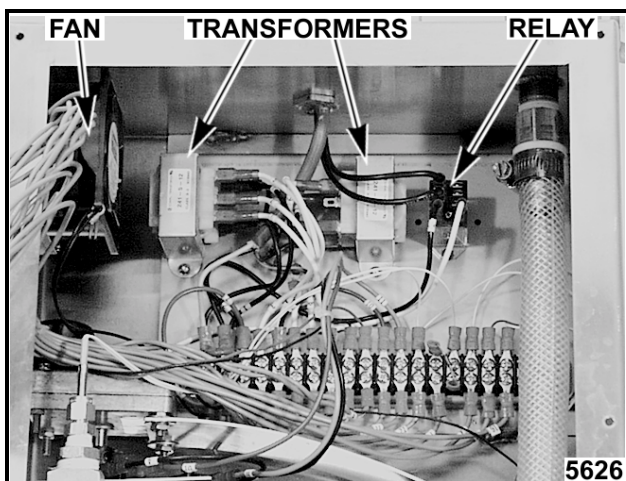
NOTE: The right side plate is sealed with RTV. The seal has to be broken in order to slide assembly to right. Also note that left plate is welded to pipe and right plate slides on pipe.

11. Work insulation off pipe.
12. Reverse procedure to assemble.

TRANSFORMERS, RELAY, FAN

WARNING: DISCONNECT THE MAIN POWER CORD.

1. Remove "FRONT COVER".
2. Identify and disconnect wires from component or terminal strip for component being replaced.
3. Remove screws securing component being replaced and remove component.



4. Reverse procedure to install.

PRESSURE REGULATOR, PRESSURE GAUGE, STRAINER, CHECK VALVE

NOTE: Pressure regulator, strainer, and check valve must be installed correctly with arrow on body in direction of water flow.

NOTE: If pressure regulator is replaced, adjust new one for 20psi. while water is flowing and mixing valve is centered between hot and cold position.

Set temperature at 95°F and allow water to flow until temperature is reached. Adjust both hot and cold regulators until gauges read 20 psi.

Refer to the INSTRUCTIONS MANUAL for complete instructions on setting the water pressure.

WARNING: DISCONNECT THE MAIN POWER CORD.

1. Shut off the hot and the cold water incoming water supplies.
2. Unscrew fitting at water meter and plumber supplied union fitting (if one was installed).



3. Replace component.
4. Reverse procedure to install.

SERVICE PROCEDURES AND ADJUSTMENTS

SOLENOID VALVE COIL TEST

1. **WARNING:** DISCONNECT THE MAIN POWER CORD.
2. Remove "FRONT COVER".
3. Identify and disconnect solenoid valve wires from terminal strip.
4. With ohm meter, check resistance between coil wires. Reading should be approximately 100 ohms.

THERMISTOR TEST

1. **WARNING:** DISCONNECT THE MAIN POWER CORD.
2. Remove "FRONT COVER".
3. Identify and disconnect thermistor wires from terminal strip.
4. With ohm meter, check resistance between thermistor wires. Initial reading should be approximately 12,000 ohms at room temperature (70°F).

NOTE: With meter connected, resistance may start changing.

PROBE TEST

1. **WARNING:** DISCONNECT THE MAIN POWER CORD.
2. Disconnect probe connector.
3. With ohm meter, check resistance between pins on probe plug. Initial reading should be approximately 12,000 ohms at room temperature (70°F).

NOTE: With meter connected, resistance may start changing.

GEAR MOTOR TEST

1. **WARNING:** DISCONNECT THE MAIN POWER CORD.
2. Remove "FRONT COVER".
3. Identify and disconnect gear motor wires from terminal strip.
4. With ohm meter, check resistance between motor wires. Reading should be approximately 30 ohms.

FAN MOTOR TEST

1. **WARNING:** DISCONNECT THE MAIN POWER CORD.
2. Remove "FRONT COVER".
3. Identify and disconnect fan motor wires from terminal strip.
4. With ohm meter, check resistance between motor wires. Reading should be approximately 350 ohms.

CALIBRATION PROCEDURE

Test

1. Deliver 20 pounds of water using an accurate scale to measure.
2. If error is less than 5%, calibrate delivery amount.

NOTE: Calibration procedure can only be performed on control boards that have a program chip version 22 or higher installed. If an earlier version chip is installed, replace it with the latest version.

If error is more than 5%, replace flow meter.

Delivery Amount Calibration

NOTE: This procedure adjusts the pulses per volume rate for the flow meter. Any changes should be made one increment at a time and checked after each adjustment.

1. To change this setting:
 - A. Press "Set Temp" key.
 - B. Enter 32.
 - C. Press "Set Amount" key.
 - D. Enter 93303 (933lbs. 3oz.)

- E. Press "Start" key.
 - 1) Current stored value is displayed in the water temperature setting window.
- F. Enter desired value between 100 and 500 which represent pulses per gallon.

NOTE: Default value is 154 pulses per gallon.

- G. Press "Start" key to save new pulse rate and return to normal operation mode.

Solenoid Correction Test

1. Deliver 1 pound of water and measure the number of ounces of error.
2. Repeat step 1 three times.
3. Calculate the average error of the three deliveries.

NOTE: Unless the flow meter is grossly out of calibration, this amount is the error due to the closing speed of the solenoid valve.

4. If deliver error due to solenoid is less than 5 ounces, perform the solenoid correction calibration to correct.

If delivery error due to solenoid is more than 5 ounces, replace solenoid.

Solenoid Correction Calibration

NOTE: This procedure compensates for the time delay when the water solenoid shuts off. Any changes should be made one increment at a time and checked after each adjustment.

1. To change this setting:
 - A. Press "Set Temp" key.
 - B. Enter 32.
 - C. Press "Set Amount" key.
 - D. Enter 92202 (922lbs. 2oz.)
 - E. Press "Start" key.
 - 1) Current stored value is displayed in the water temperature setting window.
 - F. Enter desired value between 0 and 200. This represents flow meter pulses added to compensate for the time delay.

NOTE: Default value is 4 pulses.

- G. Press "Start" key to save new pulse rate and return to normal operation mode.

Flush Time Calibration (applies to M-3 units only)

NOTE: Flush is used on chiller meters to flush water until the temperature has equilibrated. Flush time required may vary depending on locations.

1. To change this setting:
 - A. Press "Set Temp" key.
 - B. Enter 32.
 - C. Press "Set Amount" key.
 - D. Enter 91101 (911lbs. 1oz.)
 - E. Press "Start" key.
 - 1) Current stored value is displayed in the water temperature setting window.
 - F. Enter desired value between 0 and 120. This represents time in seconds.

NOTE: Default value is 30 seconds.

- G. Press "Start" key to save new time and return to normal operation mode.

Units Lockout

NOTE: This prevents or allows changing the dispensing units between Celsius/Fahrenheit and Pounds/Liters.

1. To change this setting:
 - A. Press "Set Temp" key.
 - B. Enter 32.
 - C. Press "Set Amount" key.
 - D. Enter 94404 (944lbs. 4oz.)
 - E. Press "Start" key.
 - 1) Current stored value (000) or (001) is displayed in the water temperature setting window.
 - F. Enter desired value 0 or 1. Code (000) means lockout disabled and code (001) means lockout enabled.

NOTE: Default value is Disabled (0).

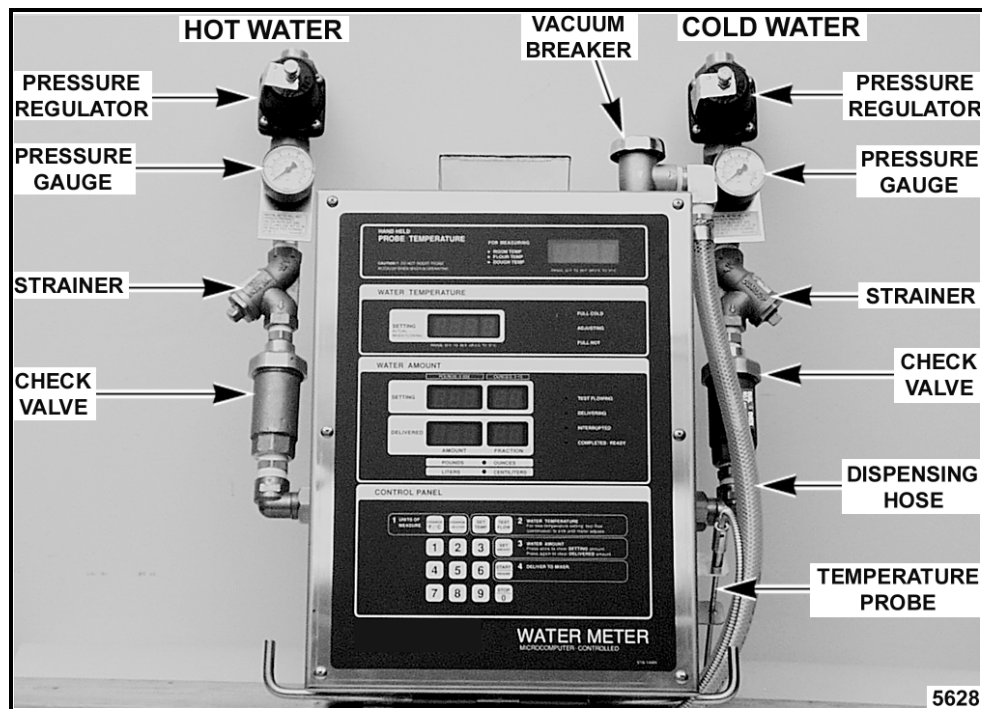
- G. Press "Start" key to save code and return to normal operation mode.

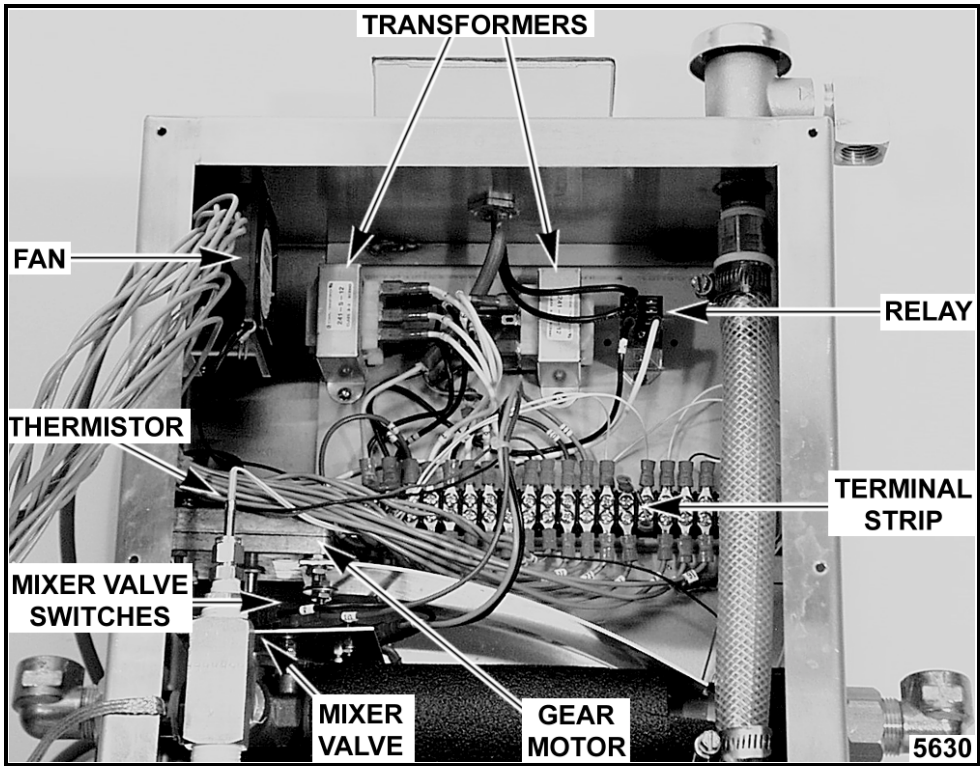
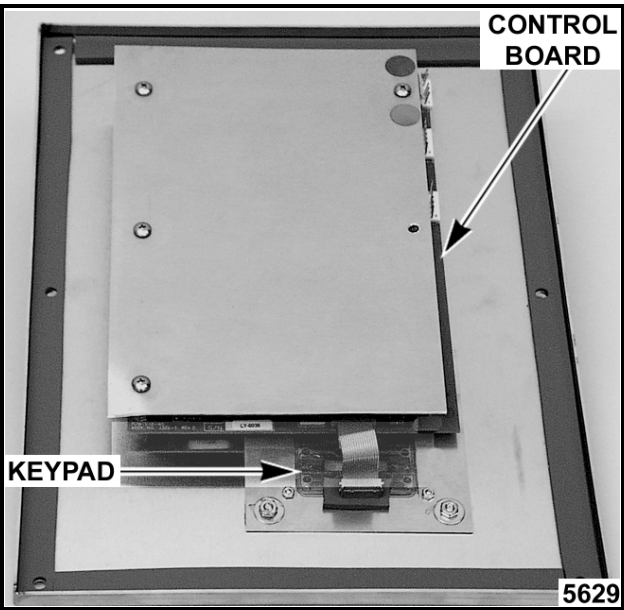
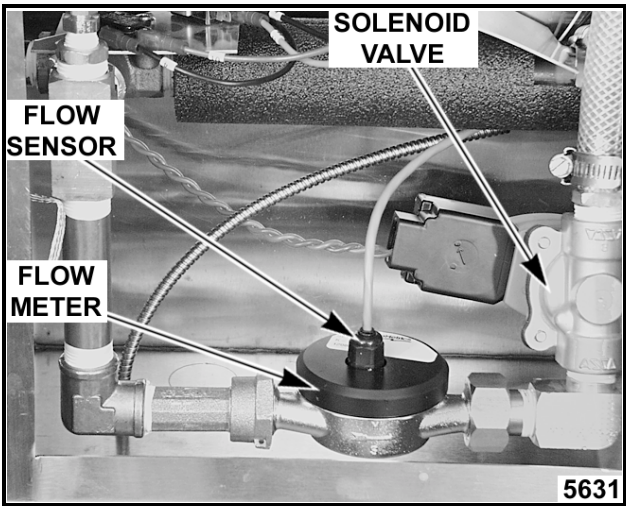
ELECTRICAL OPERATION

COMPONENT FUNCTION

CONTROL BOARD	Controls operation of water meter.
MIXER VALVE SWITCHES	Signals control board when mixer valve is in maximum hot or cold water position.
GEAR MOTOR	Drives mixer valve according to signals received from control board.
FAN MOTOR	Rotates fan to circulate air within the box.
FLOW METER / SENSOR	Monitors water flow and sends signals to control board. Meter is a positive displacement paddlewheel style. This flow meter sends out a nominal 154 electrical pulses per gallon that are read by the microprocessor control.
THERMISTOR	Monitors water temperature inside mixer valve and sends signals to control board.
TEMPERATURE PROBE	Measures temperature of product in mixer bowl.
SOLENOID VALVE	Controlled by control board to dispense water.

COMPONENT LOCATION

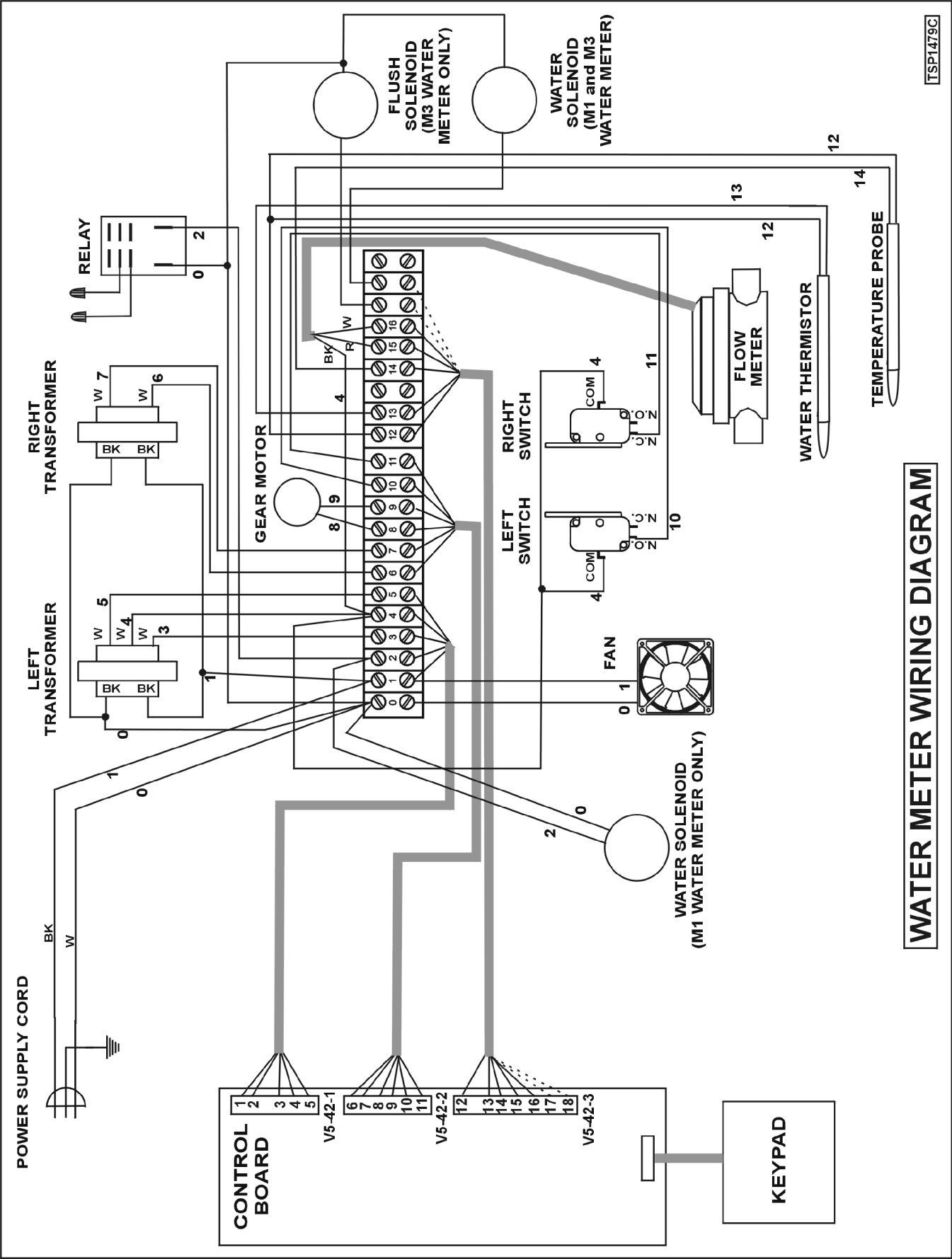




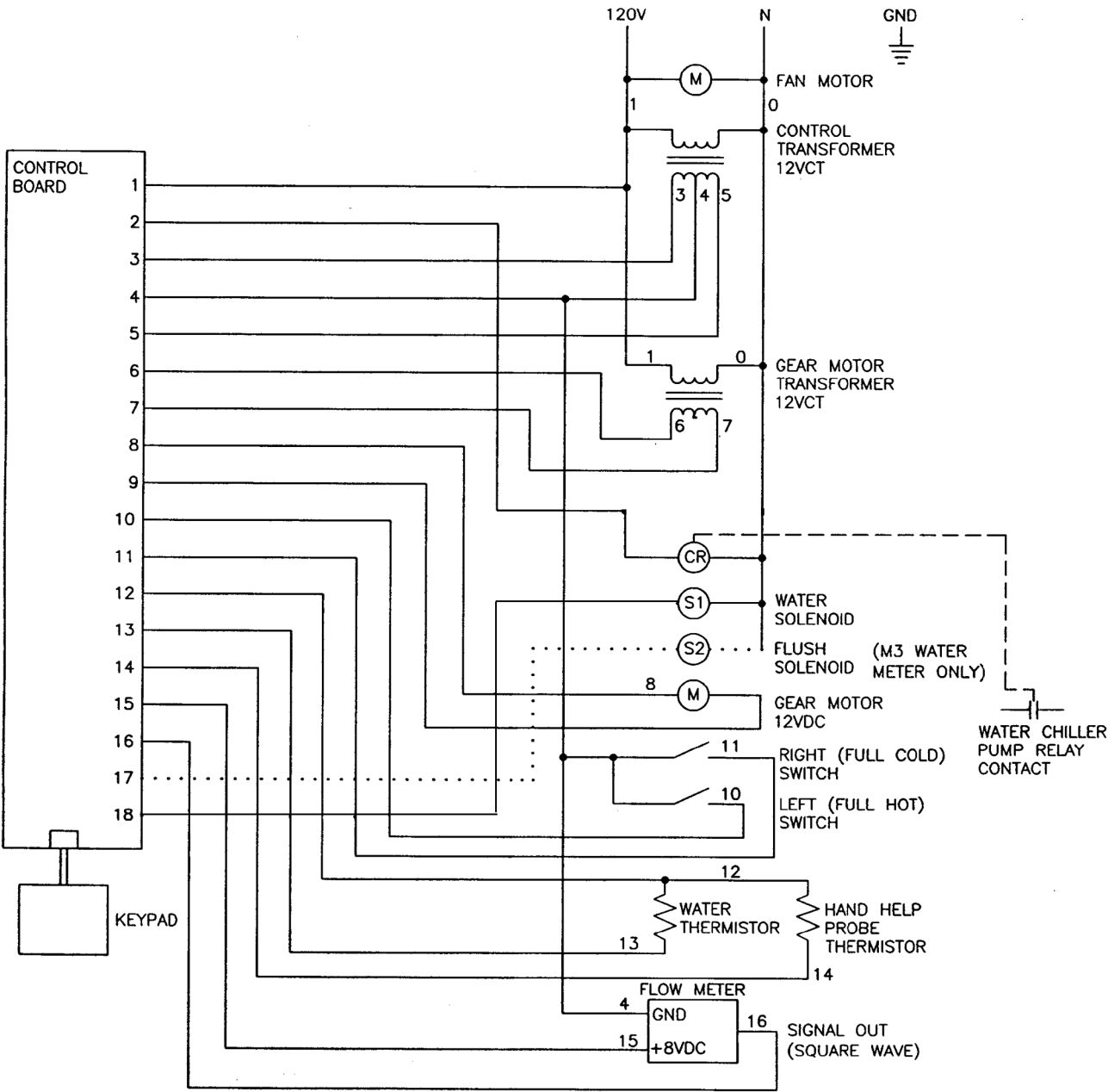
WIRING DIAGRAM

TSP1479C

WATER METER WIRING DIAGRAM



SCHEMATIC DIAGRAM



WATER METER SCHEMATIC

5632

TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSES
Unit is plugged in but no displays lit.	<ol style="list-style-type: none"> 1. Tripped breaker. 2. Loose wire connections. 3. Transformer malfunction. 4. Control board malfunction.
Unit is plugged in, displays lit, but no response to keypad input.	<ol style="list-style-type: none"> 1. Control board memory corrupted. Unplug meter for at least 8 hours to reset memory. (Memory is backed up by a capacitor which will discharge when meter is unplugged) 2. Loose keypad cable connection. 3. Keypad malfunction. 4. Control board malfunction.
Hand-held temperature display reads 32 at all times. (Typically indicates open temperature sensor circuit)	<ol style="list-style-type: none"> 1. Loose hand-held probe plug connection. 2. Loose internal wiring. 3. Probe malfunction. 4. Control board malfunction.
Hand-held temperature display reads 99 at all times. (Typically indicates shorted temperature sensor circuit)	<ol style="list-style-type: none"> 1. Probe malfunction. 2. Shorted internal wiring. 3. Control board malfunction.
Temperature of water delivered is out by more than $\pm 2^{\circ}\text{F}$. (Temperature is best measured by delivering at least 20 pounds of water into a large plastic, <u>not</u> metal, container after the meter temperature has stabilized.)	<ol style="list-style-type: none"> 1. Temperature fluctuates due to having other than 20 psi flow pressure at both inlets. (Pressure must be checked with the meter set to an intermediate temperature, not when "Full hot" or "Full cold" lights on the meter are lit.) 2. Internal water temperature probe malfunction. 3. Control board malfunction.
Delivery amount is out by more than $\pm 1\%$. (Delivery amount is best measured by delivering at least 20 pounds of water using an accurate scale to measure.)	<ol style="list-style-type: none"> 1. Flow meter out of calibration. Calibrate as outlined in Service Procedures and Adjustments "CALIBRATION PROCEDURE".
Temperature won't adjust.	<ol style="list-style-type: none"> 1. No water pressure (no flow) to both or one side (hot or cold) of water meter inlet. Ensure proper (20 psi) pressure to both hot and cold inlets. 2. Loose or bad wiring connections. 3. Water temperature sensor malfunction. 4. Mixer valve gearmotor malfunction. 5. Transformer malfunction. 6. Mixer valve limit switch malfunction. 7. Control board malfunction.
Temperature won't settle into set temperature, goes above and below set point by more than 3 degrees.	<ol style="list-style-type: none"> 1. Temperature fluctuates due to having other than 20 psi flow pressure at both inlets. (Pressure must be checked with the meter set to an intermediate temperature, not when "Full hot" or "Full cold" lights on the meter are lit.) 2. Water supply temperatures fluctuating by large amounts (hot water tank or chiller could have run out of tempered water or be on long line runs, etc.)

CONDENSED SPARE PARTS LIST

WATER METER	
Part Number	Description
01-10J410-1	Cover, PC Board
01-10J348-1	Probe, Handheld
01-10J460-1	Meter, Flow
01-100V10-110	Transformer, 120V
01-10J429-1	Microswitch
01-10J422-101	Thermistor, Water
01-10J423-1	Valve, Solenoid
01-100V17-204	Gauge, Pressure
01-100V17-330	Regulator, Pressure